

## Section 4.2 Relations and Functions

Curriculum Outcomes	Related Activities	Page in Text
<ul style="list-style-type: none"> <li>explore and apply functional relationships and notation, both formally and informally</li> <li>graph by constructing a table of values, by using graphing technology, and when appropriate, by intercept-slope method</li> </ul>	<ul style="list-style-type: none"> <li>introduce and explore functions given their graphs</li> </ul>	<b>164</b>
	<ul style="list-style-type: none"> <li>Understand the connection between a function and a relation using cause-and-effect relationships</li> </ul>	<b>165</b>
	<ul style="list-style-type: none"> <li>develop a test to determine quickly whether the graph of a given relation is a function</li> </ul>	<b>171</b>

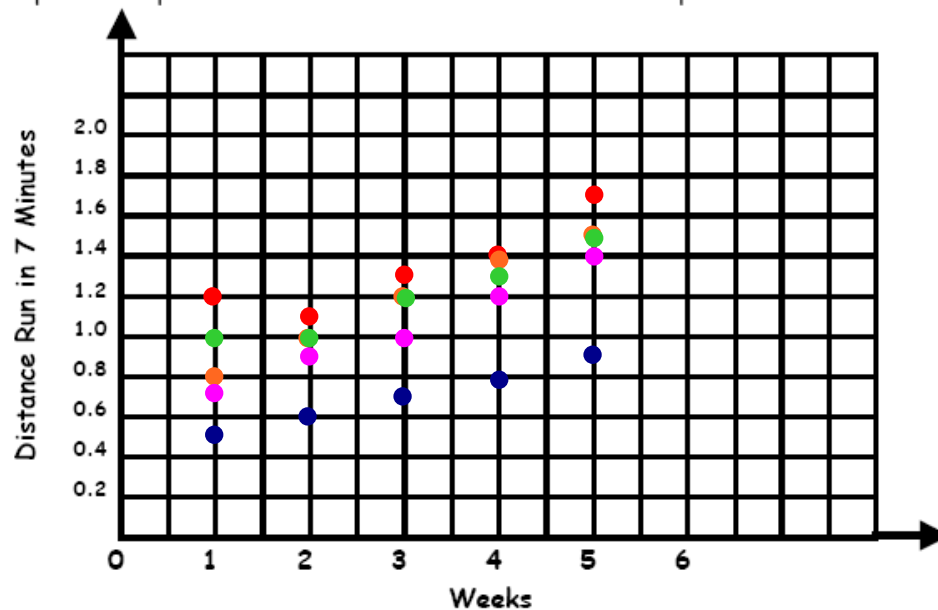
Freda has joined four of her friends in a fitness group during her gym class. Their improvement in running capacity is being tested every Friday. In addition to regular training, they also jog 20 minutes in preparation for the Friday test. For five weeks, Freda's group has recorded how far each runner can go in a seven-minute run during gym class.

The gym teacher was interested in the relationship between the number of weeks of jogging and running capacity. As capacity is estimated by the distance run in seven minutes, the distances run in seven minutes were recorded each Friday for five weeks.

FREDA'S GROUP					
Week	Feda (km) ●	Vanila (km) ●	Liz (km)	Tracy (km)	Ruth (km) ●
1	0.5	1.2	0.8	0.75	1.0
2	0.6	1.1	1.0	0.9	1.0
3	0.7	1.3	1.2	1.0	1.2
4	0.8	1.5	1.4	1.2	1.3
5	0.9	1.7	1.5	1.3	1.5

### Questions

- A Graph all the points from the table above. Label all the points for each runner differently.



B

It appears that there is a relationship: as the girls participate in consistent, regular exercise over time, their running capacity improves, and each week they can run farther in 7 minutes.

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Predict how far each member of the group will run in week 6. Explain how you made your prediction.

Freda: 1.0 km  
Vanita: 1.9 km  
Liz: 1.7 km  
Tracy: 1.6 km  
Ruth: 1.6 km

Predict how far Vanita will run in seven minutes during week 10. Explain, with reference to domain and range, whether your answer is reasonable.

- You will need to extend your graph to find the distance Vanita could run in seven minutes after 10 weeks of jogging.
- This is called "extrapolation": predicting values outside the data. This value is not always accurate, and you must evaluate your answer to determine if it actually makes sense and is possible.
- For example, Vanita's body strength will not allow her distance run to continue to increase forever.
- In this case the domain and range need to be defined for a reasonable prediction to be made.
- The graph suggests that she will be able to run 2.6 km in 7 minutes. That's faster than riding a bicycle.
- This continuous increase in distance run is NOT possible so the prediction is not reasonable.
- Reliability diminishes the further and further you move away from the data.

## Classwork/Homework

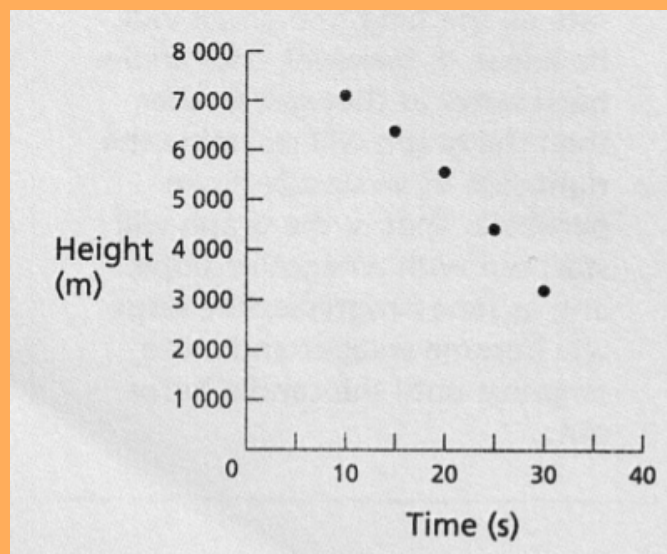
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For #9 you will need to draw the line of best fit and determine the equation of a line ( $y = mx + b$ )

Remember, in order to find the eqn. of a line:

- find the slope ( $m$ ) using two points
- find the  $y$ -intercept ( $b$ )

8a)



- The graph represents a function as there is only one y value for each x value.
- The graph is non-linear